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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BEFORE THE

COMMITTEE ON COMMERCE

UNITED STATES SENATE

ON S. 2814

April 11, 1962

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before this Committee on S. 2814, the legislative proposal recommended by the President to provide for the establishment, ownership, operation, and regulation of a commercial communications satellite system, as it has been amended and reported out by the Senate Committee on Aeronautical and Space Sciences.

The research and development programs carried out by the National Aeronautics and Space Administration have now reached a point of development from which it is possible to plan for an early operational capability for satellite "space stations" that can add a tremendous new resource to meet the increasing needs for world-wide communications facilities. Legislation is now

essential to provide a policy and operational framework within which we may build on our research and development efforts, and it is my purpose here today to recommend the early enactment of S. 2814, substantially as it has been amended by the Senate Space Committee.

Just as it has led the world in research and development in this field, the United States now has the further challenging opportunity to furnish leadership in developing an operational pattern through which this dramatic new means of communications can be proven to be not only technically feasible but a practical and economic reality. However, if we are to meet and fulfill this opportunity, we must provide without delay for the organization and the financing which are essential in order that the planning for the system can go forward at a rapid pace. Although spectacular accomplishments in space, such as manned space flight, dramatize a nation's capability in science and technology, the demonstration of our purpose and ability to use our new space tools to accomplish tasks of practical benefit, as when we provide a more efficient means of increasing our present communications work-load capacity, will give an image of a

nation at work in space which may be as important in eliciting international cooperation as any but the most spectacular events.

Today, the United States needs to place the strongest emphasis on the necessity for getting a driving effort going within and among the communications companies with the know-how to solve the technical problems involved in bringing an operating system into being, and also on creating the greatest incentives possible to establish a commercial communications satellite system at the earliest practicable time. S. 2814 will provide the organizational framework for this effort, and, in keeping with our system of free enterprise, place it under private ownership.

S. 2814 also prescribes the functions and responsibilities NASA will have in connection with the development and operation of the communications satellite system, and in relation to the Corporation which would be created under the bill. These are set forth principally in Section 403 (b) beginning on page 9; they have not been changed significantly by the amendments adopted by the Senate Space Committee.

If S. 2814 is enacted, NASA will not have any regulatory or supervisory powers over the Corporation. Under Section 403 (b)

NASA will have, first, the responsibility to advise the Federal Communications Commission on the technical characteristics of the system. The term "technical characteristics" includes such factors as the number of available channels in the satellite system, its transmission quality, the desirable orbital characteristics, the capability for multiple access, the percentage of available time for reliable communication between designated points, the capability to expand services at a future date, and similar things. In addition, NASA will advise the FCC on the technical feasibility of attaining the desired technical characteristics. Some of the factors affecting this technical feasibility are booster availability and capacity to obtain the planned orbits, the influence of the space environment on the system, spacecraft control technology, the availability and limitations of spacecraft energy sources, and other such items on which NASA will be expert and current as the result of its overall efforts in space exploration.

The responsibility to advise the FCC on all these factors is a corollary of NASA's responsibility to consult with the Corporation on the technical characteristics of the system which is pro-

vided for under Section 403 (b) (4) of the bill. It will be essential, we believe, for NASA and the Corporation to establish a close and continuous relationship for the purpose of determining the design and technical characteristics of the initial system, as well as of subsequent modifications and improvements. There should be a constant cross-feeding of engineering and scientific information, R&D results, test results, and the data on the actual operation of the system. The technical characteristics of the system will, as I have indicated, also be affected by work done by NASA in fields other than satellite communications -- for example, the development of improved solar cells, power sources, antennas and receivers for Deep Space Communications may indicate the adaptability of new techniques for the communications satellites.

It will also be essential for NASA to keep the FCC fully and regularly informed on the technical characteristics of the system, as they evolve and change, so that the FCC can carry out its responsibilities for approving the operational system, planning for the allocation of the facilities of the system

among users, and similar matters. Conversely, the FCC may ask NASA to work on changing the characteristics of the system in order to improve compatibility with existing communications systems, to provide more efficient or economical service, or for other purposes.

In connection with this NASA responsibility, I might note that the basis for the coordination of the activities of NASA and the FCC in space telecommunications was established in a Memorandum of Understanding between us, dated February 27, 1961. Both before and since that date, NASA and the FCC have worked closely and, I think, effectively on the many matters of common interest to us in the field of space communications. We would expect that this coordinated effort will continue.

NASA's third responsibility under the bill will be to coordinate its research and development program relating to space communications with that of the Corporation. This again is a corollary of our responsibility to consult with the Corporation on the technical characteristics of the system. In the course of such consultation, we believe it can be expected that NASA and the Corporation will agree on how they

might complement the R&D programs of each other, in order to expedite the development of an operational system. In addition, after this initial communications satellite system has been developed and is in operation, NASA and the Corporation should continue to coordinate their R&D projects directed at developing new and advanced techniques in space communications, which might eventually be incorporated into the system.

I would stress in this connection that the research and development necessary for the immediate improvement of the operational system so as to make it more efficient and economical will be the responsibility primarily of the new Corporation, but that NASA will continue to have an interest in and responsibility for research aimed at long range improvement and augmentation of future systems through the development of more advanced techniques in space communications. We might also assist the Corporation in R&D projects with the immediate aim of improving the operational system, subject to reimbursement of NASA's costs by the Corporation. Further, NASA would continue to consult with the Corporation on the effect such improvements might have on the technical characteristics of the system.

Another of NASA's functions in relation to the activities of the Corporation will be to furnish satellite launching and associated services, including launch vehicles, in connection with the development and operation of the system. We will have two separate responsibilities in this respect, which are prescribed by Sections 403 (b) (3) and (b) (5) of S. 2814: First, to furnish vehicles and launching and tracking services needed for the development of the system, and second, to furnish them for the operational system. The only distinction between these responsibilities is that for the developmental phases NASA will be required to furnish only such vehicles and services as it considers necessary for the most expeditious and economical development or improvement of the system. This limitation is, of course, a practical necessity. The demand on launching vehicles and launch facilities available to NASA is very great, and we must be able to balance the requirements of the space communications program against those of other programs which are of equal importance in NASA's and this nation's overall scientific effort. It would not be

desirable, therefore, to require NASA to furnish launch vehicles and services for a satellite which, in the judgement of NASA's own scientists and technicians, would not contribute to the expeditious and economical development of the operational system, or its improvement. However, in connection with the operational system itself, it will be mandatory on NASA to furnish all the launching and associated services required for the establishment, operation or maintenance of the approved system, and we would expect to fulfill this responsibility.

This is an important distinction, Mr. Chairman, between the launchings associated with the development of the initial system and of new and improved techniques for the system, and the launchings required to establish the operational system approved by the FCC and to maintain it in use. As to the first, under Section 403 (b)(3), NASA would be given some discretion in the matter of providing launch vehicles and services to the Corporation, for the reasons I have stated, whereas in connection with the operational system, we would under Section 403 (b)(5) be required to furnish the vehicles and services necessary to establish and maintain the system.

NASA's final responsibility, and this is more in terms of an authorization, will be to furnish other services to the Corporation, on a reimbursable basis, and to the extent we are capable of doing so. What is contemplated in this regard is that the Corporation may request NASA's assistance for services other than launching and tracking, such as environmental testing of components, for example, or data analysis, when it does not have the facilities to perform them itself. To the extent feasible, NASA would furnish such services to the Corporation, on a reimbursable basis.

I might note that there is an analogy here to the practice followed by the old National Advisory Committee for Aeronautics of making the research facilities in governmental installations available to the commercial airline industry and other industries, on a reimbursable basis, to assist them in solving their technical problems, such as were encountered with the Electra and other types of aircraft.

NASA would have only one other function under S. 2814. Under Section 403 (c) (3), we would advise the Secretary of State as to the technical feasibility of furnishing communi-

cations services by means of the satellite system to a particular foreign point, before the Secretary requested the FCC to determine whether a carrier should be required to furnish such services. This function is, of course, entirely consistent with NASA's responsibility to advise the FCC on the technical characteristics of the system.

Quite aside from the specific responsibilities NASA will assume under S. 2814, I should like now to comment on the significance of the President's proposals. The bringing into being of a world-wide communications satellite network should, it seems to me, be considered in the light of recent developments growing out of World War II, when we developed the capability for large-scale organized effort in science and technology. I know the President holds this view.

Since the end of the war, we have gone through a great national debate as to the peacetime application of the war and postwar lessons derived from the work of scientific and technological teams in atomic energy, in radar, in rocketry, and in many areas involving new metals, materials, and techniques. We have learned that these developments have rev-

olutionized the conceptual framework against which we must judge what is possible and what is impossible at the particular time.

In aviation, it took this nation forty-five years to move from the first flight of the Wright Brothers to the modern, readily available jet air service which we know today. It has taken but four years from the flight of the first man-made satellite to the point where we are actively considering, as a nation, participating with other nations in three major innovations of vast potential which involve the establishment of world-wide services. I refer, of course, first, to the use of the meteorological satellite to vastly expand our world-wide reporting of weather phenomena; second, to the world-wide communications satellite operational system envisaged by S. 2814; and third, to the possibility of expanding the use of navigational satellites into a world-wide system available to ships and planes that travel the conventional oceans of water and air and, indeed, to extend it on to those new vehicles, spacecraft, which are required to sail the ocean of space.

The decisions made by the United States since World War II which are embodied in the Atomic Energy Acts of 1946 and 1954, in the National Science Foundation Act of 1950, in the National Aeronautics and Space Act of 1958, and in the Arms Control and Disarmament Act of 1961, comprise a pattern through which this nation is moving on, step by step, to work with other nations, using the tools and capabilities of science and technology for the benefit of all mankind. Any view of the President's proposals in S. 2814 which does not recognize them as a part of this continuing pattern has not caught the vision toward which the President reaches.

Before closing, I should like to comment briefly on the amendments to S. 2814 which have been adopted by the Senate Space Committee.

A sensible and workable compromise has been developed in the provisions for the ownership and control of the new Corporation which will be created to establish and operate the communications satellite system. As this Committee knows, the President recommended that a broad base of private ownership be authorized for the Corporation, so as to avoid its

domination by a small group of companies, and in order to permit the American public to share in such ownership. The Senate Space Committee's amendments would preserve this concept, but at the same time would guarantee that the communications common carriers will have a substantial voice in the management and direction of the affairs of the new Corporation. I believe this is highly desirable, and that it will improve the chances that the communications satellite system will be developed expeditiously and operated efficiently.

The amendments adopted by the Space Committee also provide that three public members will be appointed annually to the Board of Directors of the Corporation by the President, by and with the advice and consent of the Senate. In a sense this is a change more of form than of substance, since S. 2814 originally authorized representatives of the President to attend meetings of the Board and to have access to the books and records of the Corporation.

We favor the amendment reducing the initial price of the stock in the Corporation to $100. a share. This will enable an even larger segment of the American public to participate in

the ownership of the Corporation, which is one of the major objectives of the President's proposal.

The one other significant amendment adopted by the Senate Space Committee would clarify the provisions of S. 2814 relating to the ownership of the ground stations required for the communications satellite system, by providing expressly that both the new Corporation and the communications common carriers may be authorized by the FCC to establish and maintain them. NASA favors this kind of flexible provision, and we agree that, as the amended bill now provides, the essential criterion to be applied by the FCC in determining who shall own the ground stations should be how the public interest, convenience and necessity will best be served. However, we believe that the amendments of the Senate Space Committee may have gone further to foreclose the determination of the FCC under this criterion than is desirable, by providing also that the Commission should encourage the ownership of the ground stations by the communications common carriers. We suggest, therefore, that this Committee should give the most careful consideration to this issue of the ownership of the ground stations.

Now, in conclusion, may I say again that the enactment of legislation to carry out the President's program in this area of satellite communications is a matter of extreme importance and urgency. Our country has a great opportunity -- and a great stake -- in being the first to establish a commercial communications satellite system to serve the communications needs of the entire world. By achieving this, we will demonstrate again to the world not only our technical capabilities, but that the activities of the United States in space are, as the Congress declared in the National Aeronautics and Space Act they should be, truly devoted to peaceful purposes, for the benefit of all mankind.

The strongest impetus which can be given to the task of developing s system which is technically feasible as quickly as possible will be by creating the organization for getting the job done. S. 2814, as amended by the Senate Space Committee, provides a workable and comprehensive plan for such an organization, and I would urge this Committee to take prompt and favorable action on it.

Thank you for the opportunity to present these views.